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PROBLEMS FOR SOLUTION.

ALGEBRA.

291. Proposed by L. E. NEWCOMB, Los Gatos, Cal.

An empty water tank has two inflow pipes A, B, which begin to flow at the same moment. When B, the smaller pipe, has discharged s gallons, and the tank is $1/n$ filled, water from both pipes is turned off. After A, B, have been idle, each as many hours as would suffice it to perform $1/m$ the work done previously by the other pipe, the flow, which is of a uniform rate, is resumed and continued till the tank is filled; B during the second working period has discharged t gallons. (1) What is the capacity of the tank? (2) What would be the capacity if B were an outflow pipe?

292. Proposed by REV. R. D. CARMICHAEL, Anniston, Ala.

Find the sum of the series $1^2 + 5^2 + 14^2 + 30^2 + \ldots + [\tfrac{1}{6}n(n+1)(2n+1)]^2$.

GEOMETRY.

324. Proposed by FRANK LOXLEY GRIFFIN, S. M., Ph. D., Instructor in Mathematics, Williams College, Williamstown, Mass.

Find all plane curves such that the normal lengths intercepted by the co-ordinate axes are in a constant ratio for all points.

325. Proposed by A. H. HOLMES, Brunswick, Maine.

An aeronaut, describing the earth's appearance from a certain height, said it seemed like an immense bowl with the horizon for its rim. (1) At what height would the apparent deepness of the "bowl" be the greatest? (2) To what height would the earth's surface again appear flat?

CALCULUS.

247. Proposed by J. SCHEFFER, A. M., Kee Mar College, Hagerstown, Md.

Integrate, $x\dfrac{\partial^2 y}{\partial x^2} + 2\dfrac{\partial y}{\partial x} - xy = 0$.

248. Proposed by REV. R. D. CARMICHAEL, Anniston, Ala.

Evaluate $\displaystyle\int_0^{\frac{1}{2}\pi} \sin nx \cot x \, dx$, where n is a positive integer.

249. Proposed by G. B. M. ZERR, A. M., Ph. D., 4243 Girard Avenue, Philadelphia, Pa.

Ike, running with constant velocity v, is trying to catch Jim, running with constant velocity V, $(V > v)$, by keeping Jim dead ahead of him. Find their paths.